

due to the lack of a recognizable preamble. Applicant has corrected Claim 1 by amending the preamble to identify that the claim is restricted to a tool. The correction to Claim 1 also makes dependent Claims 2 and 3 definite. Claim 12 has been made definite by changing the word "chambers" to "chamber" as Examiner suggested.

Rejections on the prior art were made over the reference to Darrah alone (No. 5,450,773), or over Darrah in view of Haist (No. 2,107,568).

Examiner rejected Claim 1 on the reference to Darrah in view of Haist. This rejection is respectfully traversed. Darrah teaches a pair of pawls, each having a single tooth, pivotally mounted in chambers within a yoke to drive a gear about which the yoke pivots. Power tool yokes are typically driven by shafts at rotational speeds well in excess of 2,000 revolutions per minute. Haist teaches the use of pawls having two teeth in a manually operated ratchet where the yoke moves less than 60 cycles per minute.

Two other distinctions are also immediately apparent. First is the scarcity of available space in power tools. A power driven tool is required to contain more moving components and clearances therefor in the same relative space as a hand tool such that in the power tool the space and clearances for each component require more strict tolerances and design considerations.

Second, in a power tool motion of the internal parts is continuous. The yoke moves continuously as does the selected pawl. Yet the path of the pawl is directly related to the path of the yoke and is not a simple pivotal motion with respect to the gear to be driven or the teeth of the gear to be engaged.

Thus it should be apparent that the design considerations in obtaining driving engagement between gear teeth and pawl teeth are substantially different between power tools and manually operated tools because of those differences. In a manually operated ratchet, the pawl teeth normally are urged into engagement with the gear teeth before the driving stroke begins. In a fast moving power tool, the yoke starts moving in the driving direction before the pawl teeth engage the gear teeth. To obtain the advantages of multiple pawl teeth in a power tool, the pawl teeth must position themselves with respect to the gear teeth as the yoke moves.

It is respectfully suggested that Examiner has improperly combined Haist with Darrah in the rejection of Claim 1 since the two references cannot be combined to yield the same tool without substantial and significant modification which is not taught by the art and which amounts to invention. It is respectfully suggested that Examiner's statement on page 4 of the office action which reads: "Haist discloses the teeth on each pawl to be of different size for preventing the pawls from disengaging the gear" is not correct. Haist's pawl teeth are of the same size. Haist's gear teeth are of shortened height and rounded at the ends. (page 2, left column, lines 32-39). Applicant's gear teeth are lengthened and have a reduced angle between the converging sides. Haist also teaches rabbeting adjacent teeth on the pawl to provide a deeper groove between adjacent pawl teeth in order to enable the pawl "to 'take hold' after the operator has swung the handle only through a relatively small number of degrees." (page 2, left column, lines 45-50). Haist does not make one of his pawl teeth shorter

than the other one as applicant claims, and applicant's teeth "take hold" while the yoke is continuously swinging.

Filed herewith to traverse the rejection on Darrah in view of Haist is an affidavit under 37 CFR 1.132 with attached exhibits which illustrate that equally sized gear teeth and pawl teeth would jam during operation of power tools. Applicant's drawing figures 14-17 illustrate how applicant's specially constructed gear teeth and pawl teeth provide snug pawl seating and jam free operation. Also it is to be noted that Haist was issued in 1938 when high speed power ratchets and the associated problems connected with the transfer of power via yoke and pawls which moved rapidly and simultaneously along different paths did not exist. The pawl and gear arrangement of Haist does not answer the problems which is why the teachings of Haist have not appeared in power tools in the 59 years since Haist was issued.

Except for the amendment to its preamble, Claim 1 is being resubmitted in substantially unamended form. Claim 1 differs from the references of record and all known references in reciting that the teeth of the gear are sized and shaped such that the outwardly presented angle of each gap between teeth is greater than the inwardly presented angle of each tooth. Claim 1 also recites that the teeth on each pawl are differently sized and shaped to work with the gear teeth as the pawl is moved to forcibly urge its respective pawl into snug fitting disposition in the gap on the gear as it is pivoted toward the gear. As explained above, this unique and novel structure which allows pawl seating prior to gear movement is a major part of the invention. The pawl tooth and the gear

pawl teeth shorter than the other one as applicant claims, and applicant's teeth "take hold" while the yoke is continuously swinging.

Filed herewith to traverse the rejection on Darrah in view of Haist is an affidavit under 37 CFR 1.132 with attachment drawings which illustrate that equally sized gear teeth and pawl teeth, as taught by Haist for manual tools, would jam during operation of power tools. Applicant's drawing figures 14-17 illustrate how applicant's specially constructed gear teeth and pawl teeth provide snug fitting pawl seating and jam free operation. It is to be noted that Haist was issued in 1938 when it was not expected that ratchets would have to be developed to transfer power via yoke and pawls which moved rapidly and simultaneously along different paths. That fact alone explains why the pawls of Haist have not appeared in power tools in the 59 years since Haist was issued.

Except for the amendment to its preamble, Claim 1 is being resubmitted in substantially unamended form. Claim 1 differs from the references of record and all known references in reciting that the teeth of the gear are sized and shaped such that the outwardly presented angle of each gap between teeth is greater than the inwardly presented angle of each tooth. Claim 1 also recites that the teeth on each pawl are differently sized and shaped to work with the gear teeth as the pawl is moved to forcibly urge its respective pawl into snug fitting disposition in the gap on the gear as it is pivoted toward the gear. As explained above, this unique and novel structure which allows pawl seating prior to gear movement is a major part of the invention. The pawl tooth and the gear move as a unit without surface slippage or sliding between the abutting surfaces;

move as a unit without surface slippage or sliding between the abutting surfaces; with minimum wear between interlocking teeth; and without noticeable power loss. Based upon the foregoing, it is respectfully suggested that amended Claim 1 is allowable.

Dependent Claim 2 which was rejected over Darrah in view of Haist is being resubmitted in unamended form. The argument set forth above with regard to favorable consideration of Claim 1 as to Darrah in view of Haist is incorporated herein by reference.

Dependent Claim 3, rejected as being unpatentable over Darrah in view of Haist, has been amended to claim that the smaller teeth in each pawl are substantially shorter and substantially narrower at their base than the larger teeth in the pawls. Claim 3 differs from Haist in that Haist fails to teach teeth on the pawls of different height and with narrower bases. Further, applicant is unaware of any known references which answer this amended claim. Based upon the foregoing, favorable consideration of amended Claim 3 is respectfully solicited.

Claims 4 - 8 have been canceled without prejudice.

Examiner rejected independent Claim 9 as unpatentable over Darrah. Claim 9 has been amended to point out more clearly the patentable distinctions between Darrah and applicant's unique and novel structure. Amended claim 9 differs from all preceding claims and the references of record and all known references in reciting that the shape of the chamber in the yoke is greater than half of a cylinder to envelop the cylindrical pawl and hold it enveloped and

retained in the chamber during pivotal movement. Neither Darrah, nor Haist, nor any other references of record nor known references teach this kind of yoke construction where a pawl is pivotally mounted and self-contained during pivotal within a chamber solely due to its shape. It is respectfully suggested that this feature is not only new but patentably new in that it eliminates the necessity for pins and other pawl mounting techniques. Darrah's pawls are "pivotally supported" on a post 86 seated in a bore; Haist's pawls are pivotally supported by springs 31, 32. Favorable consideration of amended Claim 9 is respectfully requested.

Claims 10 and 11 have been canceled without prejudice.

Examiner rejected dependent Claim 12 as being indefinite and also as being unpatentable over Darrah in view of Haist. The objection as to its being indefinite has been obviated by substituting the word "chamber" for the word "chambers" as Examiner suggested. Examiner's suggestion is appreciated. Claim 12 additionally has been amended to recite that the chamber of the yoke and the base of the pawl has complementary flat faces upon which the pawl pivots. Additionally, the claim continues to claim a pawl having a plurality of teeth. For the same reasons set forth regarding allowance of Claims 1 and 9, favorable consideration of amended Claim 12 is respectfully solicited.

Claims 13-16 have been canceled without prejudice.

New Claim 17 has been added because applicant believed it would be far simpler to submit a new claim than to attempt to amend existing claims. Claim 17 differs from all preceding claims and the references of record by claiming the

unique and novel structure through which the pawl and yoke are backloaded against each other to transfer power as a single unit. In backloading, the yoke is held firmly against the pawl all energy applied to the yoke is also applied to the pawl as if the two were a single structure. No power is lost due to springs, recesses, slippage, or the like. New Claim 17 claims a backloading means including a first cylindrical wall within the chamber, a second cylindrical wall on the pawl, said first cylindrical wall being slightly larger diametrically than said second cylindrical wall, said pawl being disposed within said chamber in such manner that the cylindrical walls are coaxial, retaining means for placing the first and second cylindrical walls in firm contact with each other as the yoke is moved in said preselected direction, and support means for moving the pawl and yoke together as a single unit as power is applied to the gear from the yoke. To applicant's knowledge, the claimed backloading structure is patentably unique and novel as is the use of backloading to obtain maximum efficiency between cooperating elements in power tools. As a result of this construction, applicant's drives produce almost twice the power at the load as the present state of the art tools which do not utilize backloading principles. In Darrah and Haist, the pawls are not seated against and move with respect to the yoke. Power is lost where the pawl is rubbed against the yoke and where the pawl teeth slide against the gear teeth. Applicant's claim of a pawl and yoke which are held together as function as a single unit is unanswered by the references of record or any known references. Accordingly, it is suggested that new Claim 17 is allowable.

New Claim 18 differs from all preceding claims and the references of records for the same reasons set forth regarding the allowance of Claim 17 and differs from Claim 17 in reciting that the yoke chamber and the pawl each have flat surfaces which are held against each other as the yoke is moved in the direction to drive the gear. For the same reasons set forth with regard to the allowance of Claim 17, Claim 18 should be allowed.

Based upon the foregoing, favorable consideration of all claims is respectfully solicited.

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